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Basics

Name	Tolga Talha Yıldız
Label	PhD Student in Computer Science, Texas A&M University
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Url	https://comicaddict.github.io/

Summary Computer graphics researcher working on the geometry and topology of interlocking structures: weaves, links, knots and polycatenanes, and how to design and fabricate them. Advised by Prof. Ergun Akleman.

Education

2022.08 - PRESENT
College Station, TX, USA

PhD
Texas A&M University
Computer Science
- Advisor: Prof. Ergun Akleman

2017.09 - 2022.06
Ankara, Türkiye

BSc
Bilkent University
Electrical and Electronics Engineering
- Comprehensive Scholarship of Bilkent University

Work

2025.08 - 2026.08

Graduate Research Assistant, DARPA project
Texas A&M University
Fall 2025 to Summer 2026. Understanding the brain through the geometry of the brain surface and its topological features, using the medial graph of the brain.

2025.01 - 2025.05

Instructor, CSCE 482 Senior Capstone Design
Texas A&M University
Spring 2025.

2024.08 - 2025.08

Graduate Research Assistant, NSF CAREER project
Texas A&M University
Fall 2024 and Summer 2025. Partitive geometry, on Prof. Vinayak Krishnamurthy's NSF CAREER grant.

2023.05 - 2023.08

Student Worker
Texas A&M University
Summer 2023, supported by Derya Akleman.

2023.05 - 2023.08

Contributor
Google Summer of Code, CGAL
Summer 2023. Worked on Vulkan in CGAL.

2022.08 - PRESENT

Graduate Teaching Assistant
Texas A&M University
CSCE 331 Software Engineering (Fall 2026); CSCE 120/121 Introduction to Program Design and Concepts (Spring 2023, Fall 2023, Spring 2024, Summer 2024); CSCE 646 / VIZA 654 Digital Image and VIST 170 (Fall 2022).

2022.08 - PRESENT

PhD Researcher

Texas A&M University

Research on woven, knotted and linked structures with Prof. Ergun Akleman and Prof. Vinayak Krishnamurthy.

- Geometry and topology of interlocking structures
- Solid and implicit modeling
- Computational fabrication

2021.11 - 2022.04

Candidate Research Engineer

ASELSAN

Development of reinforcement learning algorithms.

2021.09 - 2022.06

Capstone Project Engineer

Signalton Technology

Built an IoT device that runs audio identification, image classification and anomaly detection with embedded neural networks on low-power microcontrollers.

2021.06 - 2021.10

Research Intern

Bilkent University

Material Point Method solver for granular materials, with Prof. Uğur Güdükbay.

2021.06 - 2021.10

Research Intern

Graphics and Imaging Lab, Universidad de Zaragoza

Non-line-of-sight imaging and backprojection reconstruction with phasor fields, with Dr. Julio Marco.

2020.07 - 2020.10

Research Intern

Bilkent University

Simulation of Age of Information in stochastic queue networks, with Prof. Nail Akar.

2019.08 - 2019.09

Digital Design Intern

AYDUO Electronics

Gbit/s FPGA-to-PC Ethernet interface in VHDL.

Publications

2026

Twisted Edges: A Unified Framework for Designing Linked Knot (LK) Structures Using Labeled Non-Manifold Surface Meshes

arXiv preprint 2604.12023

2026

Hölder–Minkowski transcendental operators for associative averaging in implicit modeling

Computer-Aided Design

2026

Primal-dual polycatenanes: Modular design and construction of catenated 3D graphs from labeled 3-honeycombs and their duals

Computers & Graphics

2026

Hypergraph Rotation Systems: A Unified Framework for Linked Knot Structures

ACM Transactions on Graphics

2025

A constructive framework for discovery, design, and classification of volumetric Bravais weaves

PNAS Nexus 4(8)

2025

Fabricating Interactions through Optical Pathways

ACM Symposium on Computational Fabrication (SCF)

2025

Triply periodic mesh-based linked-structures: Design and construction of a family of periodic links based on Bravais lattices and corresponding Wigner-Seitz cells

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2024

Volumetric nonwoven structures: An algebraic framework for systematic design of infinite polyhedral frames using nonwoven fabric patterns

Computers & Graphics

2023 **Circular Average Filtering and Circular Linear Interpolation in Complex Color Spaces**
arXiv preprint 2310.08646 (with E. Akleman, S. Agarwall, D. House)

2023 **Curved Space-Filling Tiles Using Voronoi Decomposition with Line, and Curve Segments Closed under Wallpaper Symmetries**
arXiv preprint 2310.15361 (with H. Panchal, V. Krishnamurthy, E. Akleman, V. Grover)

2023 **A modular approach for creation of any bi-axial woven structure with congruent tiles**
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Skills

Programming
- **C/C++**
- **Python**
- **CUDA**
- **GLSL/HLSL**
- **JavaScript**
- **MATLAB**
- **VHDL/Verilog**

Graphics and geometry
- **OpenGL**
- **Vulkan**
- **Intel Embree**
- **Blender (Python API, Geometry Nodes)**
- **Maya**
- **Unity / Unreal**

Machine learning
- **PyTorch**
- **TensorFlow**

Awards

2017.09.01 **Comprehensive Scholarship**
Bilkent University
Full scholarship for undergraduate studies, 2017 to 2022.

2022.06.01 **Social Awareness and Activities Award**
Bilkent University Graduation Awards

Volunteer

2019.01 - 2022.06 **Super-Coordinator, Imagination Bridge Project**
Bilkent Social Awareness Projects
Coordinated the Imagination Bridge project. Super-Volunteer (2019) and Super-Coordinator (2021).

Interests

Research
- **Computer graphics**
- **Computational geometry**
- **Topology**
- **Computational fabrication**
- **Rendering**